

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because the abstract exceeds 150 words in length. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, step (b) a first "combination" of parameters is chosen. Step (b) is indefinite, since it is not clearly pointed out exactly what is meant by the term "combination." Firstly, the claim language does not make clear what exactly is involved in selecting said first combination. As presented, one could interpret the language to mean parameters are selected from among a variety of different parameters. Alternatively, one might interpret the language to mean particular parameter (voltage level and pulse duration) values. Also note that the language does not make clear how many parameters are selected for a particular "combination."

The term "secondary characteristics" in claim 1 (steps g, h and i) is unclear because it is not immediately clear what characteristics of a droplet may be classified as "secondary."

Claim 1 recites (in steps g, h and i) the term "satisfactory," with regard to the "secondary characteristics." It is not made explicitly clear how one should interpret the meaning of the term "satisfactory," since the exact meaning of "secondary characteristics" is not made clear. The claims do not set forth a standard for quantifying said "secondary characteristics" such that one would be able to precisely determine the metes and bounds of the claim. Clarification is needed. The term "satisfactory" appears in all of the independent claims 1, 10 and 13, and recur throughout the listing of claims.

The phrase, "saving those parameters for that jetting tube," recited in claim 1, step (i), is indefinite because it is unclear what association (if any) exists between the saved parameters and the jetting tube.

Claim 3 recites "a statistically popular occurrence of voltage and pulse duration." Claim 4 recites, the "next most popular occurrence." The term "popular" is unclear, because statistically, this could mean any voltage/duration with that occurs more than zero times in a statistical population set. Accordingly, it would be impossible to determine the "next most popular occurrence," if the popular occurrence before it is undefined.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 and 9-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Haselby et al. (US 5,517,217).

Haselby et al. (hereinafter, "Haselby") teaches a method for priming and using a thermal inkjet pen and an apparatus for enhancing ink-flow reliability in a thermal inkjet pen.

The method defined in claim 1 comprises essentially two parts: a first part (steps 'a' thru 'f') involving forming and detecting a droplet; and a second part (steps 'g' thru 'i') involving determining whether the secondary characteristics of the droplet are "satisfactory."

The procedure comprises the steps of detecting a discharge of ink from

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the pen, for generating at least one signal that is characteristic of that discharge; and applying this at least one signal to control the priming and use of the pen (col. 3, l. 15-23).

Specifically, Haselby's procedure is described in claim 1 of '217. A procedure for controlling the priming and use of a thermal-inkjet pen in a printing machine used for creation of documents, said printing machine having means for controlling the priming and use of the pen in response to an applied signal; said procedure comprising the steps of: directing to the pen a priming impulse of nominally suitable energy; detecting a discharge of ink from the pen, said detecting step including generating at least one signal that is characteristic of said discharge; and automatically applying said at least one signal to the priming-and-use controlling means to operate the priming-and-use controlling means; wherein said detecting step comprises, in a generally synchronized relationship with said impulse-directing step, defining said at least one signal; wherein said automatically-applying step comprises the substeps of (1) determining whether said at least one signal indicates inadequate discharge of ink from the pen and, if so, then (2) automatically directing a more-energetic priming impulse to the pen; also if so, then further comprising automatically repeating said detecting step, but with respect to said more-energetic priming impulse of said directing substep (2); but if not, then automatically refraining from directing a more-energetic priming impulse to the pen, and automatically refraining from repeating said detecting step; and wherein selection between said directing substep (2) and said refraining step is automatic and is based on said determining substep (1), with no

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preestablished schedule of priming-impulse energy versus time. See also col. 9, l. 29-43.

Regarding claims 2-5, 14 and 15 Haselby explains that for any given pen geometry, resistor size and rating, etc., a very modest amount of straightforward trial-and-error experimentation will yield the limits of permissible and suitable priming-impulse energy parameters (voltage, duration, and repetition rate). Also, Haselby explains that since the objective of the invention is to determine whether each nozzle can be made to operate correctly in response to pen-actuating pulses of rated or nominal energy (i.e., voltage and duration), tests preferably are conducted with test pulses of that energy (col. 10, l. 48-57).

If the tests indicate ink-flow failure, however, the system applies to the pen priming pulses of progressively higher energy (col. 10, l. 58-59).

The directing substep (2) of the applying step preferably comprises transmitting to the pen an electrical pulse having a higher voltage, or having longer duration, or having some combination of higher voltage and longer duration, than in the first directing step (col. 4, l. 45-54).

If a priming impulse of maximum suitable energy has been applied, the printer is suspended (col. 4, l. 35-36).

In the event of inadequate ink discharge, progressively more-energetic priming impulses (higher voltage or duration, or both) are directed to the pen, until adequate discharge results or no further energy increase is deemed suitable.

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Haselby's apparatus comprises means for indicating the presence of a liquid droplet (discharge). Specifically, the apparatus comprises some means, responsive to discharge of ink from the pen, for generating at least one signal that is characteristic of the discharge (col. 3, l. 5-10). In other words, the detector is capable of detecting whether or not a droplet is formed.

The drop detection mechanism includes an illumination detector CR1 disposed to receive the illumination 9 from the source, an optical path 5 (FIG. 2), between source and detector housings 3 and 4 respectively, a preamplifier 11 receiving the detector signal, an autotracking negative-pulse detector 15 that receives the preamplifier signal, electronic storage 16 for the resulting signal, and a microprocessor M (FIG. 5) for receiving the signal from storage and applying the signal to control the priming sequence (col. 6, l. 45-60).

The microprocessor M is programmed to carry out the procedural steps of the method described above.

Haselby specifies that "the invention has particularly great benefits when used with a pen that has multiple nozzles for ink discharge" (col. 3, l. 59-60). In such a device, multiple signals are provided which are characteristic of ink discharge from each nozzle (col. 3 l. 65 thru col. 4, l. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

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be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haselby et al. (US 5,517,217) in view of Malachowski (US 6,248,590).

Haselby teaches the elements in claim 1, as discussed above in the claim rejections under 35 USC 102(b).

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Regarding claims 7 and 8, Haselby does not teach the method including taking an image or images of the drop or droplets formed, and analyzing these images in order to determine whether the droplet formed (claim 7), or whether the secondary characteristic is met (claim 8).

As Examiner pointed out in the rejections of the claims under 35 USC 112, second paragraph, above, the "secondary characteristic" is not explicitly defined in the claims so that one could ascertain its meaning in the context of the instant invention. The secondary characteristic could be any characteristic exhibited by a liquid droplet.

Even if Haselby had not disclosed the limitations recited in claims 7 and 8, the recited limitations were known in the art.

Malachowski teaches an apparatus and method for determining flow characteristics of a flow cytometer including a sensor (88) for sensing droplet characteristics (see Fig. 1, and Abstract). The sensor (88) can utilize a camera (102) with a wide angle lens that captures a large portion of the stream or multiple cameras such as those seen in FIG. 2 where a camera (96) captures an image of the stream at an exit point of the stream and camera (98) captures an image at the droplet break-off point of the stream. In this fashion, camera (96) and camera (98) can serve as a first sensor and second sensor, respectively, for determining speeds at different points along the stream. The camera (102) as shown in FIG. 1, can capture an image (106) of the stream and display it on a monitor (114) (col. 6, l. 52-61).

The Supreme Court in *KSR* identified a number of rationales to support a conclusion of obviousness which is consistent with the proper "functional approach" to the determination of obviousness as laid down in *Graham*. Examiner notes that the Supreme Court in *KSR* identified a number of rationales to support a conclusion of obviousness which are consistent with the proper "functional approach" to the determination of obviousness as laid down in *Graham*. *KSR*, 550 U.S. at ___, 82 USPQ2d at 1395-97. The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at ___, 82 USPQ2d at 1396 (MPEP 2141).

Exemplary rationales that may support a conclusion of obviousness include: Combining prior art elements according to known methods to yield predictable results, otherwise known as rationale A (MPEP 2141). The rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than

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predictable results to one of ordinary skill in the art. *KSR*, 550 U.S. at ___, 82 USPQ2d at 1395; *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson 's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950). “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *KSR*, 550 U.S. at ___, 82 USPQ2d at 1396. If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art (MPEP 2143).

At the time of the instant invention, the modification of Haselby's by incorporating into the disclosed method an image capable sensor would have been obvious to a person having ordinary skill in the art. The ability to perform shape analysis of a discharged droplet would have provided strong motivation to combine the Haselby/Malachowski references. One might also be motivated to incorporate Malachowski's imaging technique into Haselby's method in order to be able to assess flow rate of microdroplet discharge (see col. 6, l. 52-61).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CEDRIC CHAN whose telephone number is

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(571)270-3721. The examiner can normally be reached on Monday-Thursday
8:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax
phone number for the organization where this application or proceeding is
assigned is 571-273-8300.

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/C. C./
Examiner, Art Unit 1797

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797